IS660J

Lecture 5

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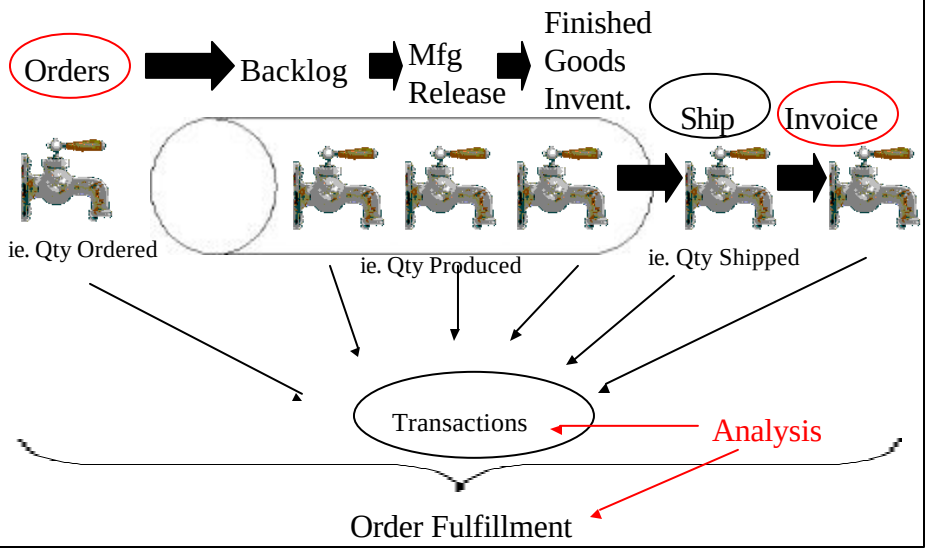
Agenda

Order Management

- Background
  - Critical business processes and metrics
- Re-review types of fact tables
- Design alternatives – ie.
  - Multiple currencies and units of measure
  - Header and line item facts
  - Lag calcs
- Real Time data warehousing

Critical business processes

Build to Order Manufacturer



Bus Matrix for Order Mgt Processing

	Date	Product	Customer	Deal	Sales Rep	Ship From	Shipper
Quotes	x	x	x	x	x		
Orders	x	x	x	x	x		
Shipment	x	x	x	x	x	x	x
Invoicing	x	x	x	x	x	x	x

Order Transactions

Business Problem

As companies have grown through acquisition, they find themselves with multiple operational order transaction processing systems. → integration

Easier to integrate in the near term into a DW

*Complete picture – order fulfillment

Order Transactions

- Grain – one row for each line item on an order
- Dimensions – Order date, Requested Ship date, Product, Customer ShipTo, Sales Rep, Deal
- Order number – Degenerate Dimension - grouping
- Facts – Order qty, gross $$$ amt, discount $$$ amount, net order $$$ amt

See figure 5.2 pg 109

Order Transactions

- Dimension Role Playing - Multiple date dimensions
  - Problem: We cannot join two foreign keys to the same date dimension table
  - Solution: Use VIEWS - pg 110

Order Transactions

- Product Dimension characteristics
  - Numerous verbose desc columns
  - Attribute hierarchies and nonhierarchical attributes
  - Transformation
    - Operational product key mapped to surrogate key – slowly changing dimensions
    - Readable text strings – constraints and report labels
    - Quality assured text strings
    - Metadata - documentation

Order Transactions

- Customer ShipTo dimension
  - Hierarchies
    - Geographical ShipTo
    - Customer's organizational hierarchy
    - Create a separate Sales Rep dimension or combine it with Customer ShipTo dimension?
      - When entities have a fixed, time-variant, strongly correlated relationship, they should be modeled as a single dimension
      - Try to keep the number of dimensions under 25
      - Avoid creating a ShipTo dimension that itself becomes a fact table
  - What if we want to analyze assignments of sales reps to customers over time?
    - Factless Fact tbl to capture sales rep coverage, even if no sales occurred

Order Transactions

- Deal Dimension
  - Like Promotion dimension ("causal" dimension)
    - Influences purchase behavior → sales
  - Sometimes referred to as "Contract"
  - Terms, allowances and incentives pertaining to a line item on the order. One dimension or many?
- Junk dimensions
  - Assess the value of misc indicators and flags and try to combine them into single dimensions
  - Figure 5.5 pg 119

Order Transactions

- MultiCurrency – local and standard currency (ie. US dollars); local does not imply location
  - Approach 1
    - Replace each order fact with a pair of facts
    - Create a Currency dimension
  - Approach 2 – Mgr. in any country wants to view order volume in any currency
    + Currency Conversion Fact tbl – see figure 5.6

Order Transactions

- Allocations – allocating header-level facts to line items (ie shipping charges)
  - Do not mix granularities
  - Create separate fact tables
  - Role of product dimension – see Figure 5.7

Invoice Transactions

The invoice governs the current shipment of products on a truck on a particular day to a particular customer

Combines the company's customers, products, and components of profitability

- Line items - Price, Discounts, Allowances
- List Price, Manufacturing and Distribution Costs
- Customer Satisfaction

Invoice Transactions

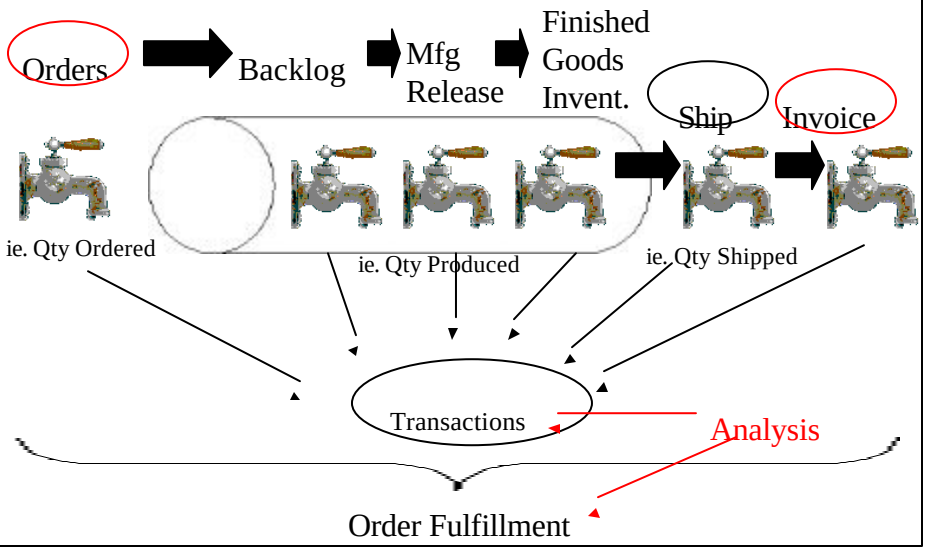
- Grain – individual invoice line item
- Dimensions –
  - Conformed dimensions – date (views), customer, product, deal
  - Shipper, Ship-from, Customer Satisfaction
- Order number – Degenerate Dimension – grouping
- Facts – P&L – see pgs 124 thru 126
- Constrain → Customer Profitability, Product Profitability, Deal Profitability

Invoice Transactions

- Customer Satisfaction (line item level)
  - Junk Dimension – textual equivalent for flags
  - Fact tbl – 1s and 0s
    - Shipped on time - additive
    - Shipped complete - additive
    - Shipped Damage Free - additive
    - % of Shipments to a particular customer on time

Critical business processes

Build to Order Manufacturer



What is fulfillment?

- Goods provided and actions taken by the vendor to satisfy the value proposition underlying the sales of a product or service.
- 3 elements of fulfillment are commonly measured:
  - Time - lag
  - Cost – crucial if it fluctuates by transaction
  - Dissatisfaction
- Product Velocity – how quickly do products move through the pipeline?

Order Fulfillment Accumulating Snapshot

- We will always revisit and update row items in our fact table as more information becomes available, or, as the order moves through the pipeline
- Grain – 1 row per lowest level of detail captured as the pipeline is entered, or, 1 row per order line.
- Dates represent major milestones of the process (surrogate keys → "unknown dates")
- Lag Calculations is the difference between any 2 of these dates

See Figure 5.10 pg 129

Order Fulfillment Accumulating Snapshot

- Multiple units of measure
  - pallets, shipping cases, scan units, consumer units, ect.
  - Do we store conversion factors in the product dimension? Usually stored in the fact tbl. row in terms of conversion factors

Review
Types of Fact tables

You often need two complimentary fact tables to get a complete picture of the business

1. Transaction
2. Periodic snapshot
3. Accumulating Snapshot

Comparison

Characteristic	Transaction	Periodic Snapshot	Accumuating Snapshot
Time	Point in Time	Intervals	Indeterminate, short lived
Grain	1 row per event	1 row per period	1 row per life
Loads	Insert	Insert	Insert/Update
Date Dimension	Transaction date	EOP date	Milestones

Each type does share some set of conformed dimensions.

Real Time Partitions

- Requirements – pg 136
- What does this mean for the different types of fact tables?
  - Transaction – same dimensional structures and facts → identical queries
  - Periodic Snapshot – subset of dimensions and facts → complex queries
  - Accumulating Snapshot – same dimensions and facts → queries need to fetch from both the main and partition tables (outer joins or unions)

Conclusion

- Order management consists of several critical business processes
- Several metrics such as sales volume and invoice revenue
- Order Management is usually one of the first marts implemented in a data warehouse → Profitability
- Next week, read Chapter 6 - CRM